Kimley»Horn

BREVARD COUNTY EAR SEPTIC TO SEWER FEASIBILITY STUDY

BACKGROUND

Florida Statues Section 163.3177(6)(c) required that Brevard County include in its Comprehensive Plan the consideration of the feasibility of providing sanitary sewer service, including identifying the wastewater treatment plant to provide the sanitary sewer, in a 10-year planning horizon to developments within the County's jurisdiction of more than fifty residential parcels with more than one septic system per one acre. This analysis must also evaluate the 20-year capacity of the identified wastewater treatment facility.

To accurately identify developments within the County's jurisdiction with more than fifty parcels and more than one septic system per one acre, the following evaluations and reviews were conducted:

- Evaluation of existing GIS data to identify parcels with known septic systems.
- Evaluation of historical wastewater treatment data for each Brevard County owned wastewater treatment facility (WWTF).
- Identification of areas containing more than fifty residential parcels with more than one septic system per acre.
- Projection of wastewater flows to be generated by these areas.
- Development of an opinion of probably cost for connecting each area to its respective WWTF.
- Determination of feasibility of connection to the County's wastewater collection system.

EXISTING CONDITIONS

Within Brevard County the Brevard County Utility Department (BCUD) owns and operates six WWTF. These facilities are located throughout the County and have a combined permitted capacity of 28.38 MGD on an annual average daily flow (AADF) basis as shown in **Table 1**. The estimated flow for each wastewater treatment plant based on populations projections through 2040 within each service area boundary is also provided in **Table 1**. The County will update projections through 2045 and beyond as part of its master planning and as applicable developments are approved and permitted.

Table 1. Summary of Brevard County Utility District WWTF

Facility	Permit	Permitted Capacity (MGD AADF)	Estimated 2040 Flow (MGD, AADF)
Barefoot Bay	FL0042293	0.90	1.15
North Brevard	FLA010263	0.99	1.32
Port St. John	FLA102750	0.49	2.12
South Beaches	FL0040622	8.00	8.00
South Central	FL0102679	12.00	12.00
Sykes Creek	FLA102695	6.00	6.00
	Total	**28.38**	**30.59**

Discharge monitoring reports (DMRs) were compiled for January 2018 through October 2023 and

report the annual average daily flow for each facility. Processes utilized at each facility vary based on the treatment method and effluent management strategy which result in varying nutrient limits. A summary of each facility along with their permitted nutrient limit is provided below.

Overall, BCUD has treated between 14.92 MGD and 16.49 MGD of wastewater per year between January 2018 and October 2023. A summary of the annual average daily flow of treated wastewater is provided in **Table 2**.

Table 2. Summary of Treated Wastewater Annual Average Daily Flow

Facility	2018 MGD AADF	2019 MGD AADF	2020 MGD AADF	2021 MGD AADF	2022 MGD AADF	2023 MGD AADF
Barefoot Bay	0.56	0.67	0.72	0.56	0.60	0.71
North Brevard	0.29	0.25	0.80	0.28	0.32	1.23
Port St. John	0.39	0.40	0.40	0.40	0.68	0.41
South Beaches	5.90	6.34	6.25	6.17	6.10	6.22
South Central	5.26	4.31	4.87	4.63	4.49	4.50
Sykes Creek	3.18	2.96	2.92	2.99	3.30	3.42
Total	**15.58**	**14.92**	**15.96**	**15.04**	**15.24**	**16.49**

In addition, Brevard County maintains a wastewater inventory, which allows for the categorization of parcels within the County by type of wastewater treatment utilized. A review of the County's wastewater inventory was conducted, and a summary is provided below in **Table 3**.

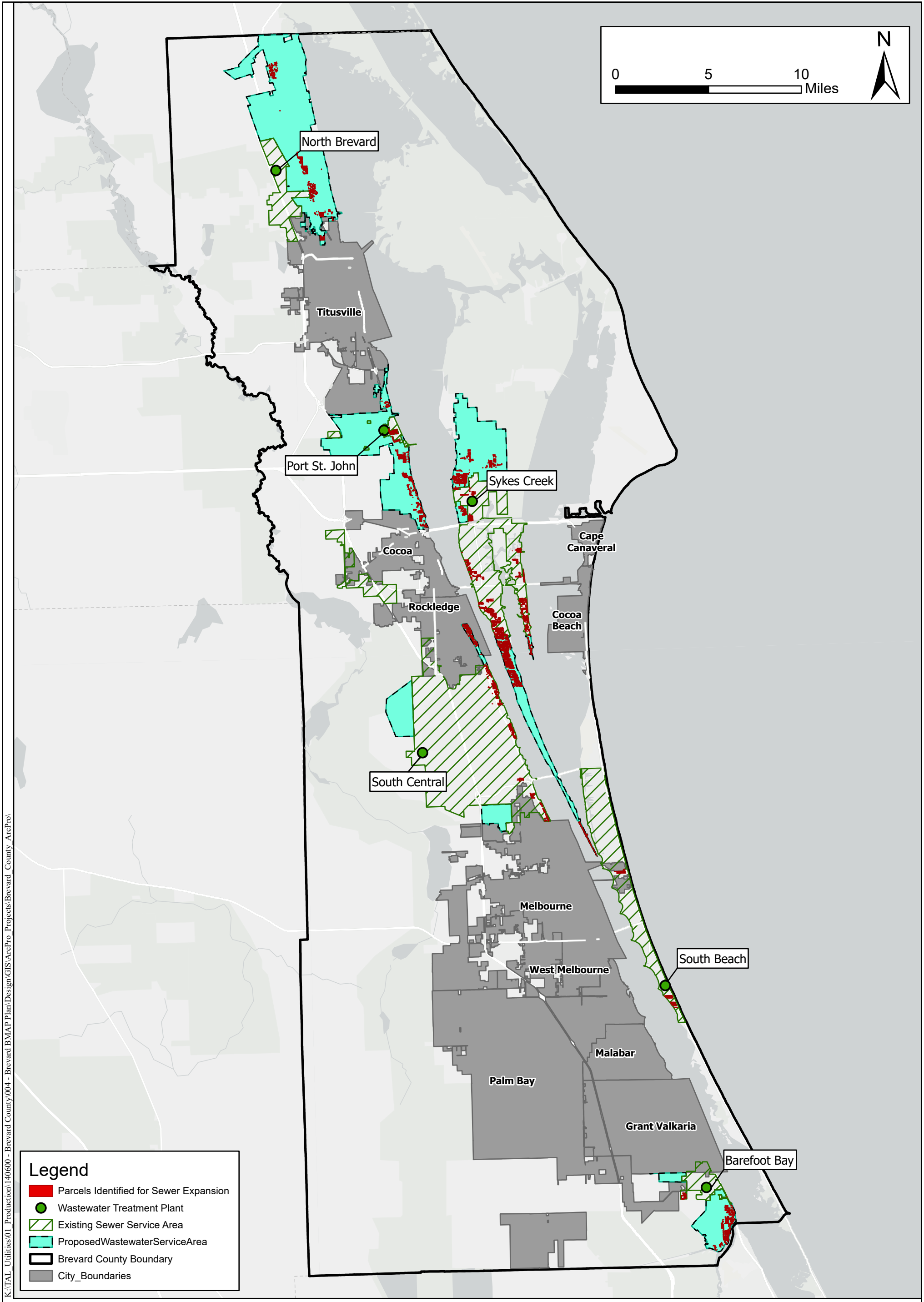
Table 3. Summary of Brevard County Wastewater Inventory

Wastewater Description	Number of Parcels
Natural / No Wastewater	53,407
Package Plant	503
Septic	62,259
Sewer	109,829
Total	**225,495**

Throughout the County there are approximately 62,259 onsite sewage treatment and disposal systems (OSDTS, or septic system), of these approximately 18,582 OSTDS are located within the unincorporated portion of the County.

STUDY AREAS FOR SEWER EXTENSION

Utilizing the County's existing septic system data, areas were identified within the service area for each WWTF which contained developments of fifty or more parcels with more than one septic system per acre. For the purposes of this evaluation, developments have been defined as single-family residential neighborhoods within BCUD's existing and proposed service areas. All areas outside of the existing and proposed service areas have been deemed unfeasible and have not been included in this evaluation. The developments included in this evaluation identified are shown in **Figure 1**.



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Source: ESRI, FDOT, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Figure 1 Areas Identified for Sewer Extension

Brevard County
EAR Feasibility Study for Sewer Extension

1 inch = 4.7 miles	*PROJECT NUMBER: 140600003*	*MARCH 2025*

Overall, 10,140 parcels with septic systems were identified within the existing wastewater service area and proposed wastewater service area, which was developed in 2024, as outlined in **Table 4**.

Table 4. Summary of Parcels for Sewer Extension

WWTF	Parcel Location: Existing Wastewater Service Area	Parcel Location: Proposed Wastewater Service Area	Total Parcels Identified
North Brevard	0	1,186	1,186
Barefoot Bay	141	728	869
Port St. John	22	1,503	1,525
South Beaches	597	0	597
South Central	742	331	1,073
Sykes Creek	2,426	2,464	4,890
Total	**3,928**	**6,212**	**10,140**

The 10,140 parcels were then evaluated to identify areas utilizing the criteria outlined in Florida Statues Section 163.3177(6)(c). Based on this evaluation 8,671 parcels were identified as being within an area for sewer extension.

Projected wastewater generation for the parcels identified as areas for sewer extension was estimated utilizing 200 gallons per day (gpd) per residential dwelling unit (EDU) based on Article IV, Division 1, Section 62-602(d)(2) of the County's municipal code. The projected wastewater that could be generation was then compared to the WWTF current permitted capacity and the historical wastewater treated at each WWTF. A summary of the projections and the WWTF capacity is presented in **Table 5a**.

Table 5a. Wastewater Generation Projections for Parces Identified as Areas for Sewer Extension

WWTF	Permitted Capacity	Projected Wastewater Generation (MGD)	Historical Wastewater Treated (MGD) (2022)	Total Wastewater to be Treated (MGD)	Remaining WWTF Capacity (MGD)
North Brevard	0.99	0.200	0.315	0.515	0.475
Barefoot Bay	0.90	0.157	0.600	0.757	0.143
Port St. John	0.49	0.264	0.430	0.694	-0.204
South Beaches	8.00	0.075	6.096	6.171	1.829
South Central	12.00	0.183	4.494	4.678	7.322
Sykes Creek	6.00	0.857	3.301	4.158	1.842
Total	**28.38**	**1.737**	**15.235**	**16.972**	**11.408**

Based on the projections presented above, the Port St. John WWTF is expected to exceed the permitted capacity of 0.49 MGD AADF if all parcels identified for sewer extension were to be connected to BCUDs wastewater collection system.

Service Area	Estimated Population within Expanded Service Boundary (2040)	Current Permitted Capacity (MGD AADF)	Estimated 2040 Flow (MGD, AADF)
Barefoot Bay	10,391	0.90	1.15
North Regional	11,874	0.99	1.32
Port St. John	19,102	0.49	2.12
South Beaches	46,268	8.00	8.00
South Central	82,342	12.00	12.00
Sykes Creek	36,740	6.00	6.00

OPINION OF PROBABLE COST

Based on the parcels identified within the service area for each WWTF, an opinion of probable cost (OPC) was developed to estimate the cost for BCUD to provide wastewater collection service to the right-of-way adjacent to the identified parcels. The OPCs were developed according to engineering judgement considering current project costs and cost trends observed in ongoing projects in Florida. In addition to the development of project costs, the OPC estimates also reflect costs associated with administration and project delivery.

Because Kimley-Horn does not control the cost of labor, materials, equipment, or services furnished by others, methods of determining prices, or competitive bidding or market conditions, any opinions rendered as to costs, including, but not limited to opinions as to the costs of construction and materials, shall be made on the basis of its experience and represent its judgment as an experienced and qualified professional, familiar with the industry. Kimley-Horn cannot and does not guarantee that proposals, bids, or actual costs will not vary from its opinions of cost.

The opinion of cost is considered to be a Class 5 estimate, in accordance with the American Association of Cost Engineering (AACE) International Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries. Class 5 estimates are typically applied to conceptual screening of alternatives. Class 5 estimates are generally based on very limited information and as a result have a wide range of accuracy ranges. Class 5 estimates are utilized for business planning purposes and assessment of initial viability. Typical accuracy ranges for Class 5 estimates are -50 percent on the low range and +100 percent on the high range. As such, the opinions are planning level only and include a 35 percent contingency factor to account for the limited detail available at this level of evaluation. The purpose of the order of magnitude OPC does, however, provide a good basis for evaluating the differences in costs between the alternatives.

Cost estimates were developed for each existing WWTF service area as well as each proposed service area. These costs were then combined to determine a total overall cost for each WWTF. A summary of the costs developed to serve the parcels identified within the existing wastewater service areas are shown in **Table 6**, while the costs developed to serve the parcels within the proposed wastewater service areas are shown in **Table 7.** The total overall cost for each wastewater service area, both existing and proposed, is provided in **Table 8.**

Table 6. OPC for Identified Parcels within the Existing Wastewater Service Area

WWTF	Parcels to be Served (Existing Service Area)	Total Estimated Cost	Total Cost per Parcel
North Brevard	0	-	-
Barefoot Bay	108	$15,646,00	$144,870
Port St. John	0	-	-
South Beach	376	$28,017,000	$74,513
South Central	614	$98,983,000	$161,210
Sykes Creek	2,160	$195,595,000	$90,553
Total	**3,258**	**$338,241,000**	**$103,819**

Table 7. OPC for Identified Parcels within the Proposed Wastewater Service Area

WWTF	Parcels to be Served (Proposed Service Area)	Total Estimated Cost	Total Cost per Parcel
North Brevard	1,002	$175,235,000	$174,885
Barefoot Bay	677	$90,266,000	$133,332
Port St. John	1,305	$140,013,000	$107,290
South Beach	0	-	-
South Central	303	$27,499,000	$90,756
Sykes Creek	2,126	$252,794,000	$118,906
Total	**5,413**	**$685,807,000**	**$126,969**

Table 8. Total OPC for All Identified Parcels

North Brevard	1,002	$175,235,000	$174,885
Port St. John	1,305	$140,013,000	$107,290
South Central	917	$126,482,000	$137,930
Total	**8,671**	**$1,024,048,000**	**$118,100**

Based on the OPCs, the total estimated cost to provide wastewater collection services to the right-of-way adjacent to all 8,671 identified parcels is $1,024,048,000, or $118,100 per parcel. However, not all parcels identified were deemed feasible as described below.

FEASIBILITY

To determine the feasibility of connecting the identified parcels to BCUD's wastewater collection system the following criteria was utilized:

- If parcels are located in the existing wastewater service area or the proposed wastewater service area.
- If more than 40 percent of the parcels in a given development are located within an area identified by the County for septic system conversions.

Based on these criteria, of the 8,671 parcels identified, 3,715 parcels are considered feasible for connection as shown in **Figure 2**. A summary of the parcels identified as feasible with projected wastewater generation and estimated costs are provided in **Table 9.**

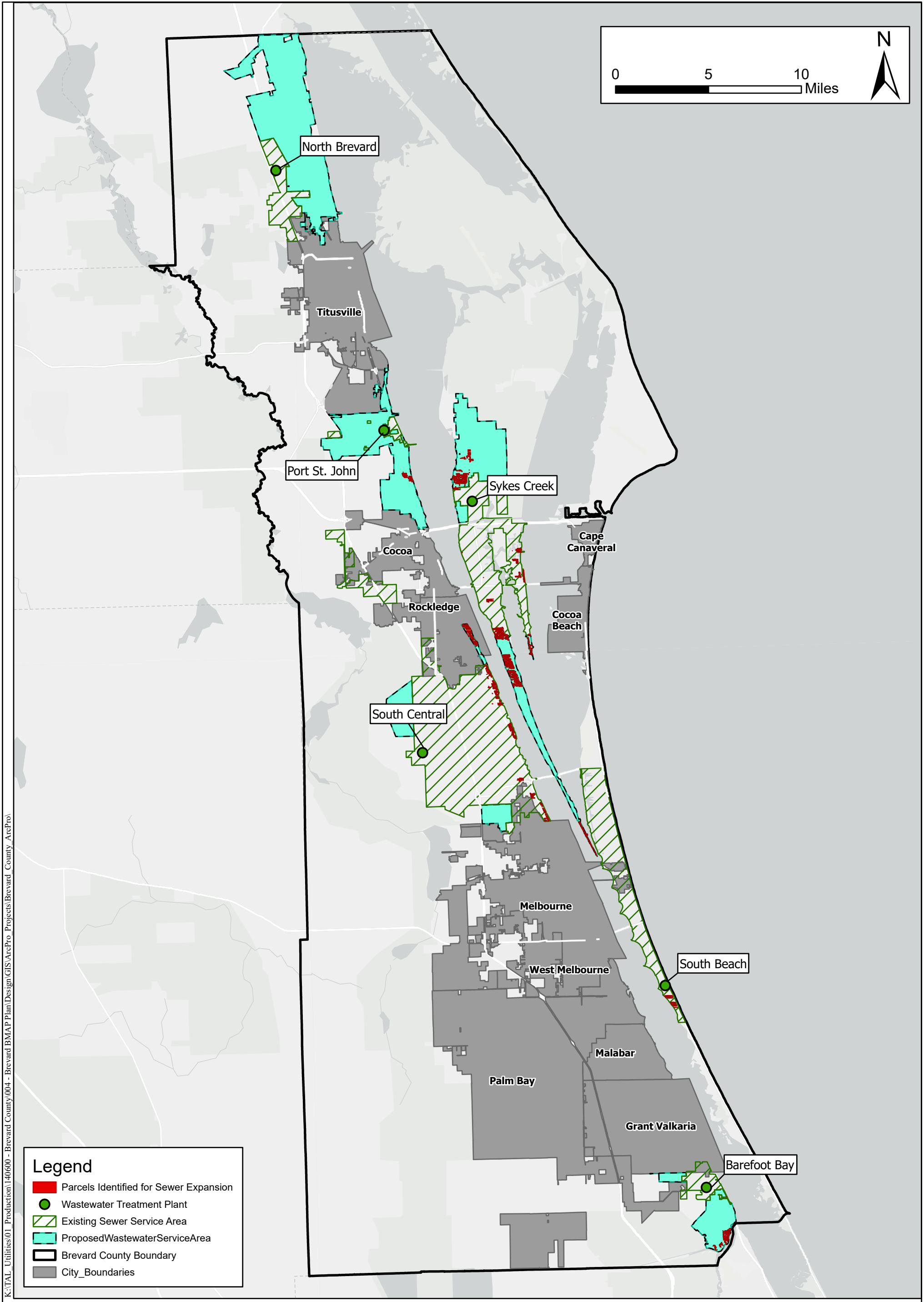

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Figure 2 Areas Identified as Feasible for Sewer Extension

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Table 9. Parcels Identified as Feasible for Connection

WWTF	Parcels Deemed Feasible	Projected Wastewater Generation (MGD)	Total Estimated Cost	Total Cost per Parcel
North Brevard	0	0.00	-	-
Barefoot Bay	247	0.049	$33,325,177	$134,920
Port St. John	207	0.041	$22,208,959	$107,290
South Beach	205	0.041	$15,257,226	$74,513
South Central	917	0.183	$126,482,000	$137,930
Sykes Creek	2,139	0.428	$223,776,031	$104,617
Total	**3,715**	**0.743**	**$421,067,393**	**$113,343**

Based on the OPC for the parcels deemed feasible, the estimated cost to provide wastewater collection services to the right-of-way adjacent to the 3,715 feasible parcels is $421,067,393, or $113,343 per parcel

The feasible parcels and associated projected wastewater generation was then compared to the WWTF permitted capacity and historical wastewater treated to determine if each WWTF would have sufficient capacity to serve these parcels, as shown in **Table 10**.

Table 10. WWTF Capacity to Serve Feasible Parcels

WWTF	Permitted Capacity	Projected Wastewater Generation (MGD)	Historical Wastewater Treated (MGD) (2022)	Total Wastewater to be Treated (MGD)	Remaining WWTF Capacity (MGD)
North Brevard	0.99	0.000	0.315	0.315	0.675
Barefoot Bay	0.90	0.049	0.600	0.649	0.251
Port St. John	0.49	0.041	0.430	0.471	0.019
South Beaches	8.00	0.041	6.096	6.137	1.863
South Central	12.00	0.183	4.494	4.678	7.322
Sykes Creek	6.00	0.428	3.301	3.728	2.272
Total	**28.38**	**0.743**	**15.235**	**15.978**	**12.402**

Based on the total number of parcels deemed feasible within each wastewater service area, it was determined that all WWTFs would have sufficient capacity to treat wastewater generated by these parcels. Additionally, based on this review of the feasibility of sewer expansion throughout Brevard County feasible parcels have been identified to be completed within the 10-year and 20-year planning horizons.